4th World Congress on Agroforestry

20-22 May 2019
Montpellier, France

Book of Abstracts

L23.P.05

The Edaphic Environment: Impact of Olive Trees on the soil beneficial interaction between Durum Wheat roots and Am Fungi

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It is said that trees improve soil fertility. It might be due to biological interactions with micro-organisms and especially with arbuscular mycorrhizal fungi. Is-it the case with olive trees in south of France?
The field experiments were conducted in South of France at INRA DiaScope experimental unit. Durum wheat was sown in 3 conditions: (AF) yearly pruned olive orchard, (AF+) never pruned olive orchard, (C) open field.
Mycorrhizal analysis was performed on 6 durum wheat cvs. For each treatment and cv, 3 replicates of 90 root fragments were analyzed at the LSTM lab.
All the root fragments coming from AFs treatments were colonized, while 96.4% for C. The intensity of AMF colonization, thus the % of the root fragment length being colonized, was significantly higher in AFs treatments (+51% compared to C), as the arbuscular abundance in the root system (+74% compared to C).
A wide variability was observed among genotypes within the same treatment. The intensity of AMF colonization ranged from 11% to 57% in C, and from 55% to 74% in AF. The genotype showing the highest intensity of AMF colonization and arbuscular abundance in AF had the lowest values in C.
AM fungi are known to be an essential component of sustainable agricultural ecosystems (Jeffries et al. 2003). Olive trees seem to play the role of permanent reservoir of AMF diversity, available to associated cereals. Arbuscular mycorrhizal (AM) fungi help the understorey crop to catch soil nutrients (Wahbi et al. 2016).

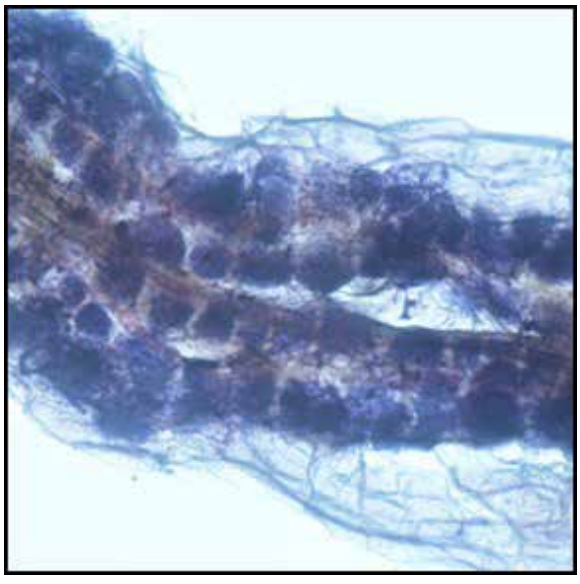

Figure 1. Photo of arbuscules in AF durum wheat roots.

Keywords: Olive tree, AMF, root colonization, soil fertility.

References:

1. Jeffries et al. 2003, Biol. Fertil. Soils, 1-16.
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